THE STUDY OF FUNGI IN YORKSHIRE

BEING THE PRESIDENTIAL ADDRESS DELIVERED TO THE YORKSHIRE NATURALISTS' UNION AT HALIFAX, DECEMBER 14th, 1907.

BY

C. Crossland, F.L.S.

REPRINTED FROM "THE NATURALIST," MARCH, 1908.

THE STUDY OF FUNGI IN YORKSHIRE.

(Being the Presidential Address delivered to the Yorkshire Naturalists' Union at Halifax, Dec. 14th, 1907).

C. CROSSLAND, F.L.S.

It is customary for each retiring President to give an address at the end of his year of office bearing upon some branch of Natural History to which he has given attention. This custom marked out the theme of my discourse on the present occasion; therefore, the only point for me to decide was which branch of the subject would be best to deal with. It occurred to me that 'The History of the Study of Fungi in Yorkshire' would be appropriate, more so, perhaps, because it was a Halifax man—James Bolton—who first wrote and published a British book dealing solely with Fungi.

My address involves no absorbing natural history problem, but consists chiefly of historic details. After a short sketch of the difficulties attending the study of this branch of natural science, the details, including a few notes on the workers, will be given in chronological sequence.

Fungi may be roughly described as cellular cryptogamic plants, devoid of chlorophyll, all either saprophytes or parasites, deriving their nutriment from a dead, or a living organic matrix. The mycelium, or spawn, almost always hid from view, may be considered to be the real plant; while the exterior structures are simply the fructification. The mycelium generally consists of fine thread-like filaments, ramifying in all directions among humus, rotting leaves, in dead wood, etc. It also penetrates the living tissues of both plant and animal. In some species it consists of tough strands of closely agglutinated filaments, like thongs of leather, in others, like sheets of wash-leather, hard knobs, etc.

'The organisms which are associated together under the common denomination of Fungi are the most protean and polymorphic in the entire vegetable kingdom, and present great difficulties in the way of generalisation.' *

They are found wherever other vegetable, or animal substances exist. The myriads of their spores, or reproductive elements, ensure their distribution. In this country they are commonest in old, moist woodlands, where decaying stumps,

* Cooke, 'Introduction to the Study of Fungi,' p. 9.

trunks, and fallen branches abound. Many species select particular environments, and are seldom found under any other conditions. In damp woods micro species are fairly plentiful through the year, but in autumn—the fungus season—it is scarcely possible to pick up a moist decaying leaf or branch that is quite free; twigs sometimes may have on them half-a-dozen species in as many inches. Many are microscopic in size, others are large; a specimen of *Polyporus giganteus* cut at Mytholmroyd a few weeks ago, weighed 45 lbs. When fungi were not so well known, it was thought we might have in this country as many fungi as flowering plants, now we know there are *three* times as many. In Britain there are over 5,500 known species, and the number is constantly increasing. In 1836, there were 1385 (Eng. Fl.); in 1860, 2380 (Berkeley's 'Outlines of British Fungology'); in 1871, 2,810 (Cooke's Handbook). In 1905, the date of the publication of the Yorkshire Fungus Flora, there were in this county alone, no fewer than 2,626 known species, and 55 have since been added. The old parish of Halifax, with an area of 129 square miles, has up to the present time yielded over 1,200 species. So long as students take the trouble to search for them, fresh things will be found year after year; new species will be discovered, and the known distribution of many that are thought rare will be considerably widened. Three new to science have been discovered this year (1907): two on the Union's excursions, and one a few weeks ago, the latter by James Needham, of Hebden Bridge. In addition to the numbers of British Fungi given above, there are the Bacteria.

The percentage of British botanists who have been attracted to this branch has always been exceedingly low: between 4 and 5 per cent. This is not surprising when we come to consider the difficulties which beset its study compared with that of the higher plants.

Fungi are very inconstant in their appearance: a species may be seen in abundance one season, and perhaps never again at the same place. Their season is of short duration; the distinguishing characters are very few compared to those of other plants, and it is often difficult to determine specifically closely allied species with any degree of certainty; fleshy species soon perish, and must be examined the same day as gathered, or the day following; if dried, many shrivel up and lose their natural characters. Again, they are less attractive than other plants to the superficial observer, and the smaller

species require special search. Doubtless further reasons why this group has been so much neglected will suggest themselves. These difficulties were seen by pioneer workers, and perhaps in greater force, when so little was known about fungi. In 1788, Bolton writes:—'Much confusion has long prevailed in this genus of plants, chiefly owing to the brief, or obscure descriptions which have been given of them; for their parts are so few, that every one ought to be regarded with the greatest care, with all that is singular and peculiar to its circumstances.' Few as the characters were, and are, Bolton suggested more than one hundred points it was possible to observe in one or other of the then known toadstools. He appears to have possessed a marvellous insight into these uninviting plants.

So far as I can learn, the oldest Yorkshire record of a fungus is *Geoglossum difforme*, Hampole Wood, near Hutton Pagnall: Mr. Stonehouse, 1650. (Lee's Fl. W.R., p. 731).

In 1672, Dr. Martin Lister, one of our oldest pioneers in several branches of science, had a paper on 'An odd kind of Mushroom,' in the 'Phil. Trans.' (p. 5116). This he found in plenty in Marton Woods, under Pinno Moor, in Craven, 18th August, 1672. Bolton refers this to *Agaricus piperatus* = *Lactarius piperatus*. In 1675, ('Phil. Trans.', p. 225), Dr. Lister contributes a paper on 'The Flowers and Seed of Mushrooms,' as instanced in *Fungus porosus crassus magnus*, very frequent in August under hedges, and in the middle of the moors in many places in Yorkshire; he also mentions another which, when cut, changes its colour to deep purple or blue.

In 1693 ('Phil. Trans.', p. 554), Sir Tancred Robinson, a Yorkshireman, refers to '*Tuber terrae*' or earth tuber. Mr. Massee considers the author to be dealing with a fungus, which, from the figure, is undoubtedly what we now call *Tuber æstivum* Vitt., our best edible truffle.

There is an interval of eighty years before we find any further mention of Yorkshire Fungi, and this is in the Catalogue of Halifax Plants, prepared by James Bolton, for Watson's History of Halifax, 1775. It includes 55 species of Fungi.

We next come to Bolton's 'History of Fungusses Growing about Halifax,' the first volume of which was published January 1st, 1788. Volume II. followed the same year. Volume III. December 1789, and Supplement, December 1791. This work was published under the patronage of the Duke of Gainsborough, and was the first British publication exclusively devoted to

Fungi. It is illustrated by 182 plates, upon which are figured 231 species. There were two issues: one coloured, the other plain. About 220 of the 231 are easily identified, and have been accepted and quoted under various names in their works by subsequent European authors, as Persoon, Fries, Rabhenhorst, and others on the Continent, and by Berkeley, Cooke, Stephenson, and Massee in this country. Many were species new to science, and others previously undescribed in Britain. Many of the plates are signed 'James Bolton, Stannary, near Halifax.' He etched all his own plates both in this and in other works dealing with different branches of natural history. He was an 'all round' naturalist, with, at least, forty years experience in the Halifax district—1758-1799. Not only birds and butterflies, flowering plants and ferns, but mosses, hepatics, algæ, lichens, and fungi came within his ken. His son, or brother, Thomas, collected butterflies, moths, beetles, shells, and fossils.

We learn that early on in his natural history observations, he took an interest in this subject. In 1788 he says:—'I have carefully observed, drawn, and described the plants of this order, when in season, for twenty-seven years past, having drawings in my possession which I made in 1761.' He rightly remarked that the Cryptogams were the most entertaining branch of botany, but had up to that time been superficially regarded. Referring more particularly to fungi, he said:—'That our knowledge of . . . [these], the last order of this class, is very deficient will evidently appear from [the fact] that a greater number of its species have been actually gathered in a compass of ground not exceeding eight or ten miles round Halifax, than has yet been ascertained in our best and most correct Catalogues of British Plants.'

We learn incidentally that his investigations were constant. In speaking of the irregular appearance of fungi, he says:—'In September, 1777, the *Helvella mitra* grew in several woods, in hedges, under trees, and even in pastures and meadows, in this neighbourhood, plentifully; since then, in the space of ten years, though my researches have been regularly kept up, I have not met with more than three or four specimens of that plant.' We have had many similar experiences, several of which are narrated in the 'Flora of Halifax.'

A remarkable instance is furnished by one of Bolton's own species—*Coprinus oblectus*. This he figured and described

in 1790. One or two later English authors did not accept it, because they had never seen it, nor has it been recorded by anyone until 1892 when it was re-discovered at Halifax. A few were also seen at Hebden Bridge. In that year it appeared at Halifax abundantly, but only sparingly the year following, and gradually disappeared. No trace of it has been seen for several years back, although the localities have been carefully observed in the season.

Bolton describes his specimens with great acuteness, in clear, concise terms, and this, be it remembered, when they were little understood. He was practically confined to superficial characters, having to work with what he calls a little 'spy-glass.' Had he had at command the compound optical appliances at present in use, he could have included microscopic details, but this was then impossible. As it is, some of his descriptions are still thought worth giving in full in recent text-books. Had all subsequent mycologists, who have written descriptions of fungi, been as painstaking, and used to the full the advantages they had over Bolton, afforded them by improved lenses, the present generation of mycological students could often have been more certain of the things they were dealing with.

There are evidences of great care throughout the work. He appears to have kept himself well posted in the drawings and descriptions of kindred workers by obtaining their publications. Those he more particularly refers to are:—Van Sterbeeck, Antwerp, 1654; Mersilius, Amsterdam, 1714.

Vaillant's *Botanicum Parisiense*, Amsterdam, 1727, contains among other excellent figures of plants, about ninety very accurate ones of Fungusses.

Micheli *Nova Plantarum Genera*, Florence, 1729, enumerates about eight hundred species, and gives a great number of excellent figures of every Genus of this order.

Battarra *Fungorum Agris Arminiensis Historia*, printed at Rimini, 1755. 40 plates.

Schæffer *Bavarian Fungi*, published at Ratisbon, 1780.

At the time Bolton's History was being issued, M. Bulliard was publishing in Paris a work entitled 'Champignon de la France,' wherein, says Bolton, 'are a great number of very beautiful figures, displaying, in a most superior manner, the Fungi of that kingdom.'

Jacquin's 'Flora Danica' is also referred to, after which

Bolton adds ' and in the excellent work of our own countryman —Mr. William Curtis, entitled *Flora Londiniensis*, now publishing in numbers, are given, interspersed with other plants, many accurate figures and descriptions of Fungusses, so that we may hope in time to say that this extensive branch of Natural History is no longer a chaos, or a shame to the science of botany.'

Schæffer, Bulliard, Jacquin and Curtis were all contemporaneous with Bolton, and, along with him, exercised a stimulating influence on the study of Fungi in this country.

Bolton was fully aware of the probability of one and the same species being described simultaneously under different names. He says he always had ' an aversion to the unnecessary multiplying of names in our botanic nomenclature ; and there is no order of plants, where we are so likely to slip into errors of this kind as in the Fungusses.'

' There is a pride in man, to be thought the inventor or discoverer of something new. In regard to things useful, this is a laudable vanity ; but to add a new name to a known plant or other subject in Natural History, because we meet with an individual perhaps distorted in its shape, diminished or increased in quantity, sickened by improper food or soil, or tinged with colours different from those of its own species, this is not only vain and ridiculous in itself, but pernicious in its consequences. It is not, however, at all times to be guarded against without a long acquaintance with the subjects under notice, especially where their specific characters are less defined and less obvious, as is the case with most of the plants which constitute the most numerous and extensive class, the Cryptogamia.'

' The incongruity of names . . . . is a stumbling block in the way of science, It is an evil, however, that must at present be [put up] with, because it is an unavoidable one ; for when several men, strangers to each other, and in different kingdoms, are engaged in the same pursuit ; suppose the same object should fall into the hands of each, and is unknown to them all, each finds it necessary to give it a name, at least a specific one, and he wishes to give it such an one as will be someway or other expressive of the object under review. . . . But men's ideas and apprehensions vary much—so that under the above circumstances, if the same object should fall under the notice of twenty different discoverers, that five out of the twenty should denominate it by the selfsame term, is little less than impossible. This is the principal cause of that confusion of names, which is

every day increasing, and which cannot easily be removed, especially in regard to plants of this order. To attempt it at present would be in vain, because the investigation of them is a branch of science now cultivated with spirit in several parts of Europe; and the field for new discoveries is still so ample, and so rich, that every new season deepens the columns of our former lists, and makes continual additions to the stock, which does not perhaps exhibit more than one-fifth part of the objects that must be investigated before mankind can be possessed of a complete nomenclature.'

Even after all these well-meant and accurate observations, we unhesitatingly excuse Bolton for making four plates of *Armillaria mellea*, and describing each under a different name. This agaric is so extremely variable in appearance that it is surprising he did not make twice as many plates of it. He wrote an 'Essay towards a Methodical Arrangement of Agarics.' Their classification was based on the number of gill series; the presence or absence of stem, of volva, of veil, etc.

Towards the end of his work, Bolton remarks:—'Throughout this work I have endeavoured to clear the subject from these difficulties wherewith it has long been encumbered. In some species, indeed, it was very difficult to determine with precision; the plants are so very similar in figure; so very different in appearance, at different stages of their growth . . . and so confounded by authors, that a man might spend his whole life amongst them, in order, clearly and accurately, to ascertain their species. . . . I have made use of all the lights I could obtain from the works of Linnæus, Hudson, Scopoli, Haller, Vaillant, Micheli, Battara, Sterbeeck, Gleditsch, Dillenius, Ray, etc., etc., and after all, I willingly submit my observations to the few who have studied the subject as devoutly as myself, to alter, change, or totally reject, such as are wrong, and I hope that those few, knowing the difficulties that attend the undertaking, will candidly overlook and forgive such small mistakes as have escaped me.'

A paragraph like this reveals the inner nature of the man—modest as to his own work; admitting that some of it may prove inaccurate as more light is thrown upon the subject, and welcoming any necessary alteration or total rejection. What could the man do more? Accuracy appears to have been his sole aim.

A German translation of his Halifax Fungusses was issued

at Berlin in four parts—1795, 1797, 1799, 1820. The first three were by K. L. Willdenow. There are a few alterations which I suppose he would consider emendations. 'There are 16 pages of Preface. The translation of Part IV. is by the brothers C. G. and T. F. L. Nees Von Esenbeck, with additional matter including 'Synopsis Generum Plantarum mycetoi dearum.' The outlines of the figures are accurate, usually; the figures are often rearranged, often reversed . . . . almost all badly coloured, *i.e.*, colour too vivid, and too dense, frequently different in tint from the original and incorrectly applied. In preface to Part I., Willdenow says:—'Bolton's work is rare in Germany, and of a high price, and that he has translated the text with great care.'* The first part being issued four years prior to Bolton's death, one would almost think some arrangements had been made with him for its translation, but there are no indications in the German issue that any were.

Bolton's other works are:—'A History of the British Proper Ferns,' (illustrated), 1785, the first Monograph of Ferns ever published in any country. In 1790, a Supplement was issued containing the British 'Horse-tails.' 'Essay towards the Natural History of the British Song Birds.' There are 24 supplementary, unpublished drawings of Fungi—1788-1794. in the British Museum (Nat. Hist.), also about 50 drawings of flowers, etc. He did a series of plant drawings for Relhan's 'Flora Cantabrigiensis,' 1785.' He was a member of the Natural History Society of Edinburgh. He sent Cryptogamic plants to J. Dickson, London (Fasc. II., pp. 59 and 86).

Hudson, in 'Flora Anglica,' acknowledges his indebtedness to Bolton among a few other British botanists, for assistance in its production. The same Flora (1788) registers *Geaster fornicatus* sent from Doncaster by a Dr. Tofield.

Dr. Thomas Flintoff, Knoyton, and Edward Robson, Darlington, sent fungi to Bolton, who refers to them as two 'diligent and well informed botanists.' Robson also corresponded with Sowerby and Withering. He was one of the original associates of the then (1789) newly formed Linnæan Society. He sent a drawing of a Geaster to the 'Gentlemans' Magazine,' Feb., 1792.

In the Transactions of the Linnæan Society, Vol. ii., 1794, Robert Teesdale enumerated 33 species of Yorkshire Fungi.

* A. Gepp, Brit. Mus. (Nat. Hist.).

They are incorporated in 'A Catalogue of the more rare plants which grow wild in the neighbourhood of Castle Howard.'

In a second paper on the 'Flora of Yorkshire' (Linn. Trans., Vol. v.) Teesdale added considerably to his first catalogue of 960 species, bringing the total to upwards of 1400: 500 being Cryptogams, the most extensive list of Yorkshire plants made up to that time (Baker, 'Fathers of Yorkshire Botany,' Y.N.U. Trans., viii.).

In James Sowerby's 'Coloured Figures of British Fungi or Mushrooms,' Vol. i., 1797, under *Peziza acetabulum* (Tab. LIX), the author remarks:—'I have been favoured with recent specimens of this Peziza by the Rev. Mr. Budstone, who found them at Sand Hutton, near York, growing on the earth at the bottom of a shady hedge; not, as usually reported, on rotten wood.' In l.c., Vol. iii. (tab. 293), 1803, two Clavariæ are referred to as being sent by the 'Rev. Mr. Hailstone, gathered on Rumbles-moor, a few miles from Bradford, in Yorkshire, in some peat holes.'

Mr. W. Brunton, of Ripon, sent fungi to Sowerby (Eng. Fl., p. 204).

In the 'Botanist's Guide through England and Wales' by Turner and Dillwyn, 1805, (Vol. ii., part 2, p. 744), Dawson Turner, in criticising a lichen from Brimham Rocks, near Ripon, named *Lichen rubiformis* by Brunton, says:—'I have taken the liberty of subjoining a mark of doubt to this plant, because the specimen I saw, the only one ever found, appeared to me merely the leaf of *L. pyxidatus* with *Sphæria mori* growing upon it.' This is the earliest instance of the recognition of the fact that fungi are parasitic in lichens.

In 1824, Mr. John Atkinson, F.L.S., Leeds, wrote a sketch of the Geographical Distribution of Plants in Yorkshire—Wernerian Memoirs, Vol. v. (1824), p. 278. He stated that the County Flora included 290 species of fungi.

Charles Waterton, the noted Naturalist of Walton Hall, near Wakefield, had an article in the 'Architectural Magazine,' (August, 1835, ii., pp. 361-2) 'On what is commonly called dry rot.' The following year he contributed an article to Louden's Magazine, (Feb. 1836, ix., pp. 74-79) on 'Fungi destroying Sycamore trees in Yorkshire.'

In 1851, a W. Anderson contributes a note to the 'Naturalist' (April, p 48) 'on a large fungus allied to Lycoperdon, at Fulford, Yorks.

1908 March 1.

The Rev. R. Wood, of Woodhall Park, near Wetherby, recorded in the 'Naturalist,' (Nov. 1852 p. 255) a rare fungus—*Geaster*, allied to *G. collegens*, and *G. hygrometricus*, but distinct from either.

The talented and venerable botanist, John Gilbert Baker, F.R.S., F.L.S., etc., for nearly forty years the valued keeper of the Royal Herbarium, Kew, collected fungi about Thirsk, from 1852-1865. Few other Yorkshiremen appear to have been giving them attention about that time. Mr. Baker corresponded with the Rev. Andrew Bloxam, a student of fungi among other things, at Harborough Magna. In June 1904, Mr. Baker kindly forwarded me, through the Kew authorities, a fine duplicate collection of dried fungi. Among them were many Thirsk specimens and numerous foreign species. Owing to the unfortunate miscarriage of a letter, the Thirsk species were not included in the Yorkshire Fungus Flora. Some future opportunity may arise of inserting them in a supplementary list. Mr. Baker was one of the first Presidents of the Union. He was born at Guisborough, North Yorks., in 1834. He commenced to study botany before he was twelve; at thirteen he was appointed curator of the herbarium at the Friend's School at York; at sixteen he was writing to the 'Phytologist' on the occurrence of Carex Persoonii in Yorkshire; at thirty-two he was appointed first assistant in the Royal Herbarium, Kew. He got through an enormous amount of botanical work. There is an excellent account of him and his work, with photo, in the January 1907, 'Naturalist.'

In 1857, the Rev. F. O. Morris, of 'British Bird fame,' noted the mushroom—*A. campestris*, at Kilnwick Percy, so late as Nov. 21st, ('Nat.' Jan., 1858, p. 10).

In 1858, Mr. E. J. Maude, Leeds, recorded the altitudinal range of the mushroom—*Ag. campestris*, as up to 1,400 feet, on the slope of Old Cote Moor, near Arncliffe, Sep. 11th. ('Nat.', Dec., 1858).

The forerunner of the present Union was the West Riding Consolidated Naturalists Society. Its place of birth was Heckmondwike, in 1861. There were Naturalists present from the Huddersfield, Halifax, and Wakefield Societies. The idea of a Confederation of Societies originated with Mr. William Talbot, Wakefield. The interests of the members were chiefly confined to the more familiar sections of natural history. In 1864, there were six of these Societies. At a quarterly meeting held at

Huddersfield, May 7th, Huddersfield, Halifax, Wakefield, Heckmondwike, Leeds, and Norland were represented. Results were published in a series of 'The Naturalist,' which ,unfortunately, had a run of only three years—1864-1867. This was again revived in August, 1875, as a 'New Series,' under the able joint editorship of C. P. Hobkirk and G. T. Porritt, afterwards by W. Denison Roebuck. It is still flourishing, and is likely to so continue. The Wakefield Society were the first to record fungi in the New Series, next came Goole, then Bradford.

At the 15th Annual Meeting, held at Battyford, near Mirfield, sixteen species of fungi, among other things, were collected. Now the era of renewed activity among Yorkshire Fungi opens.

At the Pontefract Meeting of the W.R.C.N.S., held on Easter Monday, 1877, it was decided to reconstitute the Society, change the name to the Yorkshire Naturalists' Union, and inaugurate a wider sphere of interest. Provision was made for the admission of members not attached to any local Society, and sections were formed for the several branches of natural history. Efforts were made to promote the study of what had hitherto been the 'neglected orders,' and among them, the fungi. The members who interested themselves in this branch were Mr. George Brook, Huddersfield; Dr. H. Franklin Parsons, Goole; Rev. W. Fowler, Liversedge; Messrs. Thos. Hick, Leeds; W. West, Bradford; and W. N. Cheesman, Selby. The Rev. W. Fowler was unanimously elected President under the new arrangement, thus being first President of the Union as at present constituted. Mr. W. Denison Roebuck, who had been joint Secretary of the W.R.C.N.S., was appointed General Secretary. During the course of the meeting Dr. Parsons reiterated the advice put forth by the President with respect to giving more attention to the 'neglected orders,' and pointed out the necessity of obtaining perfect specimens, and of making accurate memoranda of localities, and specimens brought to the meetings. After this, records of observations of fungi, made at the Union Excursions, became pretty frequent. They were principally by Dr. Parsons until 1879, then by W. West, Rev. W. Fowler, G. Massee and H. T. Soppitt until 1893.

Mr. Hobkirk records eighteen species in his valuable book:—'Huddersfield: its History and Natural History,' published in 1868. These are all parasitic, the author remarking 'the other tribes have not been studied in this neighbourhood.' He

occasionally exhibited micro-fungi at the meetings of the Huddersfield Society.

The list of South Yorkshire Fungi in Dr. Aveling's 'History of Roche Abbey,' 1870, is by John Bohler, a Derbyshire artizan stocking weaver. Bohler's early tastes led him to gather plants; later, he collected medicinal plants; he then took up the science of plant study, and became an expert field-botanist and microscopist. He made a special study of lichens. About 1860, he explored Snowden, and adjacent mountains and hills, under the auspices of the Botanical Committee of the British Association. He next became a great collector and student of fungi, hence Aveling's list of ninety species. He compiled a Flora of Sherwood Forest for White's 'Worksop.' He often pursued his natural history at the expense of his ordinary employment, in consequence of which he became poor, and tried to obtain a bare subsistence by the sale of micro slides of moss peristomes, parasitic fungi, etc.

In 1872, the 'Entomologists' Monthly Magazine' refers to *Coprinus comatus* in York Cemetery in connection with a beetle.

The first mention of Dr. Franklin Parsons in 'The Naturalist' is Nov. 1876, when he records twenty species of fungi found at Goole. His acquaintance with Yorkshire botany dates from 1874 to 1879, during which time he resided at Goole. He formed the Goole Scientific Society in 1875, and acted as its secretary until 1879. He was also the means of organising a Natural History Society at Selby: Mr. Cheesman, a member of our Mycological committee, being one of the results. Dr. Parsons was botanical secretary of the Union during the years 1877-8-9. Records of observations made at the Union Excursions, as well as other times, were regularly kept. He carefully investigated the Goole district, and in his report to that Society for 1878-79, submitted a long list of Cryptogams, including 179 fungi, and it must be remembered, Goole is not a particularly rich locality for this class of plant. I have been favoured by him with a long list of species he has observed in various places in Yorkshire. Mr. Fowler warmly testifies to the doctor's diligence in determining his finds. He left Goole in 1879 to take up an important appointment as one of the Medical Inspectors under the Local Government Board. This he still holds, and resides at Croydon.

The Rev. Canon Fowler has taken an interest in this subject

since the early seventies. He tells me he caught the infection for studying fungi from Dr. Parsons. They studied them together at the Union Excursions for many years. From time to time Mr. Fowler has contributed numerous records of species seen during the excursions to the 'Naturalist.' Apart from these, Coxley Valley was the locality he mostly investigated. Several uncommon species have rewarded his search. He met with a particularly rare one—*Lentinus leontopodius*—at Crowle, just within the border of Lincolnshire: this had not been seen in our county until last July, when it was found on some old timber near Huddersfield, by B. Goldthorpe, of Milnsbridge. Mr. Fowler has been a member of the mycological committee since its formation, and was its first chairman. At the Harewood and East Keswick Foray, 1898, he gave a most interesting address on 'Mycology in its Popular Aspect,' ('Nat.', October, '98). This will well repay careful perusal.

Mr. George Brook read a paper on 'Salmon Disease' at the Huddersfield Societies' meeting, April, 1877—('Nat.' iii., p. 145) He also noticed bream affected with Saprolegnia in the fish-pond at Walton Hall, Wakefield. Mr. Brook was then Secretary of the Huddersfield Society. He carried on biological investigation for some years by means of his large well-equipped private aquarium at Huddersfield. He was a F.L.S. In 1885 he was appointed Naturalist to the Fishery Board for Scotland, and later became Lecturer of Comparative Embryology in the University of Edinburgh.

Mr. W. West, Bradford, began the study of botany in boyhood. In 1870 he took it up in earnest. At the early Union excursions he rubbed shoulders with Dr. Parsons, Messrs. W. Fowler, James Abbott, Thos. Hick, and others. He was one of the early members of the Bradford Natural History Society (formed 1875). In 1878 he lectured to the Bradford Scientific Association, of which he was one of the earliest members, on Fungi, and exhibited a large number of fungal leaf parasites. Mr. H. T. Soppitt attended, and thence forward took a keen interest in the subject. The two worked together in their botanical studies for years, and added considerably to the knowledge of West Riding fungi. Their first hunting grounds were Bingley, Hawksworth, and Heaton, near Bradford. Berkeley's 'Outlines of British Fungology (1860)' and 'Cooke's Handbook (1871)' were then the most recent British systematic text-books—both most excellent works. Mr.

West was cryptogamic secretary to the Union, 1879-80. His first report was on the results of an excursion to Hebden Bridge ('Nat.', August, 1879). Erelong, his increasing business of chemist and druggist left him little time to give to field botany, and he was compelled to drop fungi, but encouraged Soppitt to continue. Although West found it necessary to drop this section, he continued to study mosses, hepatics, lichens, and algæ; these could easily be laid by and worked out as opportunity afforded. Eventually Mr. West became wholly engaged in the teaching profession as Lecturer in Biology, etc., at the City of Bradford Technical College. He and his son, Prof. G. S. West, Birmingham University, are the best known authorities on fresh water algæ. Mr. West was Chairman of the Union in 1899.

At the meeting of the Leeds Naturalist Club and Scientific Association, October, 1876, Mr. Thos. Hick delivered a lecture on 'Mushrooms,' dealing with their structure and physiology. A number of edible and poisonous species were exhibited in illustration of the lecture. Mr. Hick continued his botanical studies, obtained the degrees B.A., B.Sc., etc., and was appointed Assistant Lecturer in Botany, under Prof. Williamson, at the then Owen's College, Manchester, 1885, in succession to Mr. Marshall Ward. He became proficient in paleo-botany.

We must take our thoughts back for a moment to the dim past, when the Halifax Coal Measures were in process of formation on the surface. We have evidence that even at that remote period fungi were at work. In 1878, Messrs. W. Cash and T. Hick discovered traces of their presence in the shape of fossilized spores, mycelium, etc. in these beds. They were described and recorded in the Proceedings of the Yorkshire Geological and Polytechnic Society (1879, pp. 115-122). The two able authors generously inform us that the material and sections showing these traces of fossil fungi were found and cut by the late James Binns, a Halifax quarryman, and a field botanist. Further evidence of a similar nature was found by Prof. Williamson, in sections cut by the late James Spencer, who long resided within a few hundred yards of our present meeting place. Spencer was an ardent geologist and palæontologist. Both Spencer and Binns were well known to such distinguished palæo-botanists as the late Prof. Williamson, Count Solms Laubach, and the late Dr. Hovelacque, for their exquisite micro preparations of fossil plants.

Dr. Weiss has met with still further evidence in a section of a Halifax coal-measure fossil plant in the Cash collection at Manchester University.—('New Phytologist,' March, 1904).

The late H. T. Soppitt joined the Bradford Society in 1876. He, along with Messrs. West, J. W. Carter, and others, catalogued the plants of that district, including cryptogams. One of Soppitt's first records was *Melampsora vitellina=Lecythea calyceta*, parasitic on willow leaves at Saltaire. In 1877 he decided to try his hand at investigating some of these plant parasites, so far as his spare time would allow. He had good eyesight, and a most retentive memory. He looked forward to the first Y.N.U. Fungus Foray, 1881, when three of the few British experts were to be present. The following year he recorded between forty and fifty species of fungi, found at the Haigh excursion in September, and ninety at the Thirsk meeting the month after. The pages of 'The Naturalist' testify to his continued diligence on numerous subsequent occasions.

His researches in the Uredines unravelled the life histories of several species 'which had previously been enshrouded in mystery, or wrongly interpreted.' Dr. Plowright remarks:—'Prior to Soppitt's work, the *Æcidium* and *Puccinia* on *Adoxa Moschatellina* were regarded as being of the same species, but he demonstrated that . . . they had no relationship.' He next cleared up the life-history of *Æcidium leucospermum*, which occurs on *Anemone nemorosa*, showing it, by careful experimental cultures, to be an *Endophyllum*, and had no connection with *Puccinia fusca* which occurs on the same plant.—(Jour. Bot., Sep., 1893). Dr. Plowright further says 'He attacked that complicated problem, the life-history of the *Puccinia* on *Phalaris arundinacea*, proving that the *Æcidium* on *Convallaria majalis* belonged to one of them, which he named *P. digraphidis*, thereby opening a discussion amongst Continental botanists as to the relative value of these specific forms.' He was the first to demonstrate the connection of an *Æcidium* on earth-nut—*Conopodium denudatum* with a *Puccinia* on sweetdock—*Polygonum Bistorta*. In 1892, on a visit to Hardcastle with myself, and Needham and Pickles of Hebden Bridge. Needham said they had noticed a yellow fungus on earth-nut, and where this occurred, the surrounding sweetdock plants were soon after affected with a brown one. This information led Soppitt to undertake a series of experiments with

a view to ascertain whether any relationship existed between the two. Eventually he succeeded in proving they were but two separate stages on different hosts in the life-history of one and the same fungus—*Puccinia Bistortæ*, (Grevillea xxii. (1893), pp. 45-47). A most interesting popular account by Soppitt may be found in the Halifax Naturalist, vol. ii., pp. 108-113.

He tested *Puccinia variabilis* which occurs on dandelion leaves at Grassington, and found that all the three stages in the life cycle of this fungus were confined to that plant.

In 1894 he removed to Halifax. By so doing, the study of fungi in this district got a decided help forward. Later he checked and confirmed Klebahn's cultures of *Puccinia Pringsheimiana* on the gooseberry bush, and *Carex vulgaris*, proving the *Æcidium* on the gooseberry, and the *Puccinia* on the Carex to be the same fungus. He procured the *Æcidium* stage from a wild gooseberry tree at Windermere, and successfully infected *Carex* plants in his own garden at Halifax with the disease.

He discovered several species new to science, all of which are included in the Yorkshire Fungus Flora.

Dr. F. A. Lees, in 'Flora of West Yorkshire,' acknowledges his indebtedness to Soppitt for compiling the list of Fungi. He, along with Thos. Hebden, Cullingworth, were the principal contributors to the fungi in Rotheray's 'Flora of Skipton.' For further particulars see 'Gardiner's Chronicle, 'April 15th, 1899; 'The Naturalist,' May, 1899; and the 'Halifax Naturalist,' vol. iv.

Yorkshire owes much to the study of its fungi to Geo. Edward Massee. In his signature Mr. Massee, for the sake of brevity, omits his second Christian name. He is a Yorkshireman, born at Scampton, E.R., 1850. He was first attracted to fungi by specimens brought to the York School of Art, where he was a student in 1867. His first collecting grounds were Castle Howard Woods, and Terrington Carr. Removing to Scarborough in 1873, he studied the fungi of that district for fifteen years. During that period he discovered many species new to science, and others new to the British Flora. The former are figured in Dr. M. C. Cooke's fine set of Illustrations of British Agaricaceæ. This monumental work also contains numerous other drawings from Massee's dexterous pencil. There are also many in the British Museum (Natural History) collection.

(*To be continued*).

(*Continued from page 96.*)

Becoming connected with the Union through the instrumentality of Mr. West, he acted as cryptogamic secretary in 1881-2. At its first foray, he was one of the principals. The headquarters was at Leeds. The localities investigated were Studley Royal, and Beckwithshaw, Harrogate. Meanwood, Micklefield, and Ledstone Park were also explored. Specimens were exhibited at the evening meeting from nineteen other localities. The assistance of Mr. W. Phillips, Shrewsbury; Rev. J. E. Vize, Montgomeryshire; and Dr. C. B. Plowright, King's Lynn, had been secured. The foray was arranged by W. Denison Roebuck. About fifty of the 318 species exhibited were additions to the county flora. This foray imparted a further stimulus to field mycology. At the next foray held at Selby, October 1884—arranged by W. N. Cheesman, Mr. Massee taking the lead, another substantial addition was made.

Mr. Massee was again at Leeds, 1888, when the woods at Bramham and Harewood were visited. In the meantime he continued his investigations at Scarborough and Bulmer.

In 1890 he was engaged in the Mycological Department, British Museum (Natural History). In 1893, as Principal Assistant (Cryptogams), Kew. When Kew became attached to the Board of Agriculture, he became Vegetable Pathologist to the Board, for diseases caused by fungi. In 1900 he was awarded the Victoria Medal of Honour (V.M.H.), by the Royal Horticultural Society, for research in plant diseases. His most useful book on this subject rapidly reached its third edition, and is of great value to foresters, farmers, nurserymen, and plant growers generally. He has made numerous contributions in the shape of monographs and other articles, to 'Annals of Botany'; 'Jour. Roy. Mic. Soc.'; Linnæan Society; 'Jour. of Botany,' etc. He edited vols. xxi. and xxii. of 'Grevillea.' In addition to these are his 'British Fungus Flora,' four vols.; 'British Gastromycetes'; 'Phycomycetes and Ustilagineæ'; 'European Agaricaceæ'; 'Text-book of Fungi,' etc., and he

was joint author of the 'Yorkshire Fungus Flora.' At the Doncaster meeting held 1891, he was the means of establishing an Annual Yorkshire Foray, which is still held in different parts of the county, and to which he remains loyal. He has been absent on only a few occasions. When present, it has been his custom to address the members on some practical side of the subject. He has been President of the Mycological Committee since 1899.

Between 1880 and 1883 Mr. J. A. Wheldon, now of Liverpool, collected and studied the Uredinaceæ near Scarborough, and at Northallerton and Bedale.

Mr. George Lister, a member of the Rastrick and Brighouse Naturalists' Society, though more directly in love with conchology and fossil plants, took an interest in this branch, and collected fungi in Elland Park Wood, and about Ovenden where he resided a few years prior to his death.

We first find mention of Mr. A. Clarke, Huddersfield, as a nature student in 1877. He was then secretary to the Rastrick and Brighouse Society. Since 1882 Mr. Clarke has been the centre of mycological investigations in the Huddersfield district. He was attracted to the subject in the early eighties, and drew round him a few members of the local Societies. He secured the valuable assistance of Worthington G. Smith, a mycologist of extensive experience, in identifying species, and by degrees obtained such a knowledge of the subject as enabled him to give addresses at the various local societies' meetings. In this way considerable enthusiasm was aroused, especially when it became known there were so many esculent species in addition to the ordinary mushroom. The economic aspect caught on, and in no district in the county are edible toadstools better known or more appreciated than they are about Huddersfield.

In season, quantities were taken to the meetings; often the edible species were cooked, and the respective merits of the various kinds discussed. When it became known that a delectable species had been seen in abundance in any particular district, bags and baskets, and on more than one occasion, a horse and trap was hired to bring back the spoils. These were generally distributed, with the result that scores of people obtained, for the time being, this pleasant variation of diet. So well were the features of edible species mastered, that the mistake of cooking a wrong fungus is unknown. Several mycolo-

gists have made a beginning by hunting for species for culinary purposes. While seeking these, they have taken interest in others, and have thus developed a real scientific interest—it was so with Clarke. He went thoroughly into the subject, and in 1883 he was able to publish a long list of Huddersfield fungi in the Annual Report of the Huddersfield Botanical Society, which included many species of rare occurrence. A further incentive was given him by visiting the Union forays, and by making the acquaintance of Dr. Cooke and Mr. Massee, whose assistance has always been so generously accorded. Clarke has attended all the Yorkshire forays, with only about one exception, and has been one of the mainstays of the committee. He early developed the highly commendable practice of photographing his finds; this led to the stereo process being applied to the same purpose, and in this class of picture he was pioneer. His collection of stereo-photos of fungi is perhaps the finest known. They, along with his numerous sketches and coloured drawings, have for years been an attractive feature at our mycological gatherings.

In the photographing of fungi, Mr. Riley Fortune, Harrogate, and Mr. George Parkin of Wakefield are also doing most excellent work.

The edible side of the subject is very ancient, and not to be despised. Bolton refers to several species as being greatly esteemed. He himself was rather suspicious of *Fistulina hepatica*, and writes:—'This is said to be of the esculent kind: I have found it to taste like lamb's flesh, but how far it is to be trusted I know not.' There are seventy or eighty British edible species, most of which are found in Yorkshire, many being very substantial in their build. The popular interest appears to run mostly in this groove, and has been deemed of sufficient importance throughout the country to call forth special popular books on Edible and Poisonous species. Many species have been put to other uses.

In 1885, Geo. Roberts, in his 'Topography and Natural History of Lofthouse,' mentions *Russula virescens*, *Boletus edulis*, and *Helvella crispa*.

Mr. Thomas Hebden, Cullingworth, has long studied the fungi of Goit Stock, Harden, Bingley, etc., and discovered many uncommon species, and quite recently one new to science.—*Clavaria gigaspora*.

The Rev. Hilderic Friend has occasionally recorded species,

principally parasitic, from Roche Abbey, Kiveton, Anston Stones, and other places in South Yorkshire.

The year 1888 saw the publication, by the Union, of Dr. F. A. Lee's 'Flora of the West Riding.' A fairly exhaustive work so far at the Phanerogams are concerned. The list of Fungi contains 1009 species for the West Riding. Certainly this is, as Dr. Lees remarks, 'numerically creditable considering the few workers, and compares favourably with lists hitherto published for areas as large as our own, albeit the number is scarcely 25 per cent. of those described as British, but the distribution through the various drainage areas of the known species is still, through lack of resident observers, very far from being worked out.' Lees refers to most of the mycologists we have had under review as contributing to the Fungi.

In 1889, Mr. W. W. Strickland, then of Richmond, Surrey, published a list of 229 species, ('Naturalist,' June and July, 1889). These he collected principally about Boynton; there are a few from Scarborough and Sledmere. The records are all localised, but habitat not always given. They were collected between the years 1874 and 1885: the majority in 1880. The list is introduced by a most interesting dissertation, touching upon the difficulties of the study; the interest to be found in them; the wonderful variety of form; the value of sketching the different parts, including the microscopic features, spores, etc; the probable influence of host or dead matrix upon colour, shape or size, etc. The dried specimens were presented to the British Museum (Natural History). For years he has travelled abroad, but has continued his interest in the Union.

In 1888 the temporary attention of the Rev. C. H. B. Woodd, B.A., was attracted to Fungi by their extreme abundance in the neighbourhood of Oughtershaw, Buckden Woods, and other places in Langstrothdale. During the season he collected and figured about one hundred varieties. Later, the figures were submitted to Mr. Massee, who identified about seventy species. ('Naturalist,' May, 1891).

'My own experience with fungi commenced in 1888 at the Bramham and Harewood Foray. Mr. Clarke was my first tutor. The subject appeared to be interesting, but not easy to grasp. During the day, while collecting, it was pointed out by Mr. West, that there was a greater possibility of doing new work in this group than in any other, and that anyone at all interested in botany could not do better than make it a special line. The

interest considerably increased when the specimens collected during the day were, in the evening, displayed side by side on the show cases at the Leeds Philosophical Society's Museum. The variety in form and colour was most striking. After that, fungi opened out to me a new world, and though its study proved full of difficulties, constant plodding, in season and out, coupled with friendly assistance and advice, enabled me to conquer some of the obstacles. I take this opportunity of acknowledging generous assistance from both the Kew and British Museum mycologists, also from British and foreign specialists in the different groups.

In 1890 I made the acquaintance of James Needham, an iron moulder, of Hebden Bridge, who proved a good guide in the investigations of that mycologically fruitful district. Having gained a knowledge of the local flowering plants and ferns, he became a diligent collector of fungi, mosses, and hepatics. For years, in the season, I was never left short of fungi to work at; he could collect as many in half a day as, at first, took me all the following week to get through, the more perishable always receiving first attention. Many species new to science were thus discovered, two or three of which are named after him. Besides these were many new to Britain, all of which may be found in the 'Naturalist,' and in the 'Yorkshire Fungus Flora.' He proved most useful at the Yorkshire Forays, having developed the knack of knowing where to look for specimens, large or small. He compiled the list of plants of the Hebden Bridge district, published in the local guide book.

The present 'British Mycological Society' had its origin at Selby in 1896. It was an offshoot of the Mycological section of the Union. The idea of a National Society had often been discussed by mycologists at various times and places. The matter was again brought forward at the Selby Foray, when it was finally decided to form one. About a score members were at once enrolled; the name of the Society decided upon; and the necessary officers elected. These were G. Massee, President; Carleton Rea, Worcester, Hon. Sec.; C. Crossland, Treasurer. The objects to be kept in view were—(1) An Annual gathering of a week's duration to be held at a new locality each year, for the investigation of the mycological flora of Great Britain; (2) The publication of an annual report and *résumé* of work—British and Continental—dealing with mycology for the current year. Sherwood Forest was suggested as a suitable

place for the first foray. At that meeting, September, 1897, the number of members had increased to fifty. The 1904 meeting was held at Mulgrave Woods.

Mr. W. A. Thwaites, of Masham, has taken much interest in fungi since the Union excursion held there in August, 1901. He is a carpenter on the estate, and was selected by the head forester, Mr. W. Forbes, as assistant guide. Thwaites was much taken up with these things, so much so, that he continued to forward almost weekly consignments to Halifax during the remainder of the season, with the result that, instead of the fungus records for Masham being nil, as they were at the August meeting, they amounted to 416 at the end of the year. To these, 116 were added the following season. Many further additions have since been made, but time will not allow of more detail; this can be followed in the 'Naturalist.' Many uncommon species were found—*Venturia Thwaitesii* (Massee and Crossland) being one. Thwaites rarely sent one thing twice over unless more happened to be wanted.

Mr. Thos. Gibbs, Derby, commenced his study of Yorkshire fungi in 1899. He was then residing at Sheffield, and investigated the woods and fields at Wyming Brook, and other places near that city. He has discovered many uncommon species, two new to science, one being known as *Coprinus Gibbsii* (Massee and Crossland). Mr. Gibbs is at present engaged on the fungus flora of Derbyshire.

Mr. R. H. Philip, in addition to his close study of diatoms, desmids, etc., has made many observations on the East Yorkshire Uredinaceæ.

In 1902-3-4, Mr. T. Petch, Hedon, collected and studied Myxomycetes in S.E. Yorkshire, and made numerous additions to the Yorkshire list. He secured the expert assistance of Mr. Arthur Lister, F.R.S., Leytonstone. Mr. Petch worked very diligently at these, in addition to other departments of Natural History, as:—Land and fresh-water mollusca, marine zoology, bird life, etc. The results of his investigations on the Myxomycetes or Mycetozoa, were published in the 'Transactions of the Hull Scientific and Field Naturalist Club.' Mr. Petch is now Government Mycologist at Ceylon.

In 1903, Mr. J. E. Sutcliffe, Bradford, a pupil of Mr. Wests', first found *Plasmopara pusilla* in this country, on *Geranium pratense* at Embsay. Sutcliffe was a promising student, but was obliged to go abroad on account of his health. Other

young men are coming forward who may, in time, make an impression on their respective districts.

The work done in Yorkshire, hitherto reviewed, is, with the exception of Soppitt's researches, in the Uredinaceæ mostly systematic. This side of nature study has its place, and always must have, if we are going to keep any sort of order or arrangement in natural history objects. This is everywhere admitted in all branches of natural science. Still, the study of fungi, or any other object, from a biological standpoint, is of much higher importance, and more deeply interesting, than their simple classification. I have never attempted any work in this direction myself, but have always taken a deep interest in the work of those who have, whenever published results have come within my reach, and I look to those possessing the necessary qualifications and equipment, to take it in hand. There are any number of problems awaiting solution.

Immense advance on both morphological and biological lines, in the study of fungi, were made on the Continent by the brothers Tulasne, Dr. Anton de Bary, Dr. Oskar Brefeld, and others, during the third quarter of last century; and later, in this country, by a disciple of De Barys—Dr. Marshall Ward. Prior to this (in the second quarter of the century), the Rev. M. J. Berkeley—the Prince of British Mycologists—began laying the foundations, and suggesting points in the superstructure of this high-class work in the Ann. Nat. Hist.; Journal Hort. Soc.; Gard. Chron.; etc., and 'secured the great honour of being the founder of the important science known to-day as Vegetable Pathology.'

Mr. Harold Wager, F.R.S., F.L.S., etc., one of the members of the Mycological Committee has, at various times during the last eighteen years, conducted original research work on nuclei, and nuclear-division in fungi. The results have been published, and each article elaborately illustrated in the Annals of Botany. The following is a summary:—

(1). Observations on the structure of the Nuclei in *Peronospora parasitica*, and on their behaviour during the formation of the Oospore. (Ann. Botany, 1889).

[In this paper is announced the discovery that in the Fungi, the nuclei divide by a process of mitosis as in higher plants, and that there is a true sexuality accompanied by the fusion of two nuclei].

(2). On Nuclear Division in the Hymenomycetes. (Ann. Bot., 1893).

[Discovery that nuclear structure and mode of division —Chromosomes and spindle figure—are the same as in the higher plants. The fusion of two nuclei in the basidium is also here described and figured for the first time].

(3). On the presence of Centrospheres in the Fungi. (Ann. Bot., 1894).

[Further observations in Nuclear structure and division with description of division centres which play an important part in nuclear division in some plants].

(4). On the structure and reproduction of *Cystopus candidus*. (Ann. Bot., 1896).

[Contains an account of structure of nuclei, of division and sexual nuclear fusion in this fungus].

(5). The Nucleus of the Yeast plant. (Ann. Bot., 1899).

(6). The Sexuality of the Fungi. (Ann. Bot., 1899).

[An account of the researches on this subject, with a critical review of some explanations put forward by Dangeard and others.]

(7). On the Fertilization of *Peronospora parasitica*.

Papers also on the Life History and Sexuality of *Polyphagus Euglenæ*, have also been read before Section K. of the British Association, and at the Union Fungus Forays.

Mr. Wager has occupied several important posts in connection with the British Association, among them being President of Section K at the South African Meeting. He was for some time President of the Leeds Naturalists' Club; Chairman of the Botanical Section Y.N.U., Examiner in Botany in the University of Cambridge, Victoria (Manchester, Liverpool, Leeds), and Durham. Some time Lecturer in Botany in the Yorkshire College—now Leeds University, etc., etc.

The economic aspect has forced itself upon the attention of Botany professors and others interested. The potato epidemic which broke out in the forties, set investigators on the track of the cause of these destructive plant diseases. The life-histories of many parasitic fungi which prey upon farm, orchard, and garden produce, have since been investigated with a view to reduce their ravages.

Dr. W. G. Smith, Leeds University, informs us that the Agricultural Department connected with the University has carried on experiments in this direction since 1898. Among

numerous other investigations and experiments, seed barley has been treated to try and protect the resulting plants from the attack of that nasty disease known as smut. The clover sickness induced by a Discomycetous fungus which considerably reduces the value of the crop, has been studied; also the potato-scab; and the cause why potatoes rot when stored in 'pies' in fields and other places; and a black mould—*Helminthosporium*—which does much damage to oats and barley. Economic work of this nature is of great practical utility, and growers of field and garden produce ought to take every advantage of the valuable information resulting from such necessary investigations. Dr. Smith is President of the Botanical section of the Union.

Dr. T. W. Woodhead, Biological Department, Huddersfield Technical College, and joint editor of the 'Naturalist,' has made a detailed study of the nodules found on alder roots, also of the organism which produces them, known as *Schinzia alni*; the life history of this organism was traced through its successive stages within the tissues of the nodule. Dr. Woodhead has done much original work in the Ecology of woodland, and other vegetation in several districts, and is at present Chairman of the Botanical Survey Committee of the Union.

The latest development in the Mycological Committee has been to apportion the work, and make certain individuals responsible for certain groups. This will facilitate the investigations both throughout the year, and at the annual forays. The present Committee consists of:—G. Massee, Kew, President; C. Crossland, Secretary, Halifax; Rev. Canon Fowler, Liversedge; Harold Wager, Leeds; A. Clarke, Huddersfield; W. N. Cheesman, Selby; Thos. Gibbs, Derby; C. H. Broadhead, Wooldale; J. W. H. Johnson, Thornhill; R. H. Philip, Hull; and H. C. Hawley, Boston, Lincs.

Annual forays have been held in various parts of the county since 1891. Each successive meeting, coupled with individual effort through the year, has added to the stock of information. Constant additions have been made to the county flora. It would be tedious to give the particulars of each year's work, though such a table would be interesting. Let it be sufficient to say that during the last twenty years the number of known Yorkshire fungi has been more than doubled, and the knowledge of their distribution considerably increased; and that, within this period, twenty-nine species new to science, and sixty-five

new to Britain have been discovered in the county. The results of the investigations up to 1905 are included in the 'Yorks. Fungus Flora' and Appendix.

A desire for more information about these plants, by Naturalist Societies generally, is increasing. The Union members at the ordinary excursions have, during the last few years, displayed a deeper interest in the subject than ever before. Several have forwarded specimens from their own districts among whom may be mentioned Mr. Bunker, Goole; Dr. Corbett, Doncaster; Rev. F. H. Woods, Bainton; Mr. P. F. Lee, Dewsbury; and Mr. W. P. Winter, Bradford.

Seeing that wide areas are yet uninvestigated, and that others have only been casually visited, the probabilities are, if the subject continues to be diligently pursued, numerous further additions will certainly be made.

An up-to-date systematic text-book, dealing with British Pyrenomycetes is much needed. We are a long way behind other countries in this respect.

While the 'Naturalist' has been my chief mine in compiling the above, I have derived much information from other sources as Bolton's 'Halifax Fungusses'; Grevillea; Journal of Botany; Annals of Botany; and other works, a full bibliography of which would be too lenghty to quote. In addition, each and all, now living, who have at any time taken interest in Yorkshire fungi, have cheerfully sent me all the information they possessed suitable for my purpose. I have also been indebted to the following, to whom I tender my sincere thanks for consulting various works:—Messrs. B. Daydon Jackson, Secretary Linnean Society; G. Massee, and A. D. Cotton, Kew; A. Gepp, British Museum (Natural History); and W. Denison Roebuck. Britten and Boulger's 'British and Irish Botanists' has proved very useful.

Every care has been taken not to overlook any fact that would tend to make the history more complete; if any such has been omitted, I shall consider it a favour to be advised